Water and Environment Support

in the ENI Southern Neighbourhood region

Activity: N-E-DZ-1

Workshop on the WES marine litter activity in Algeria

Introduction to marine litter monitoring & overview of the state-of-the-art methods

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LDK Consultants Global EEIG

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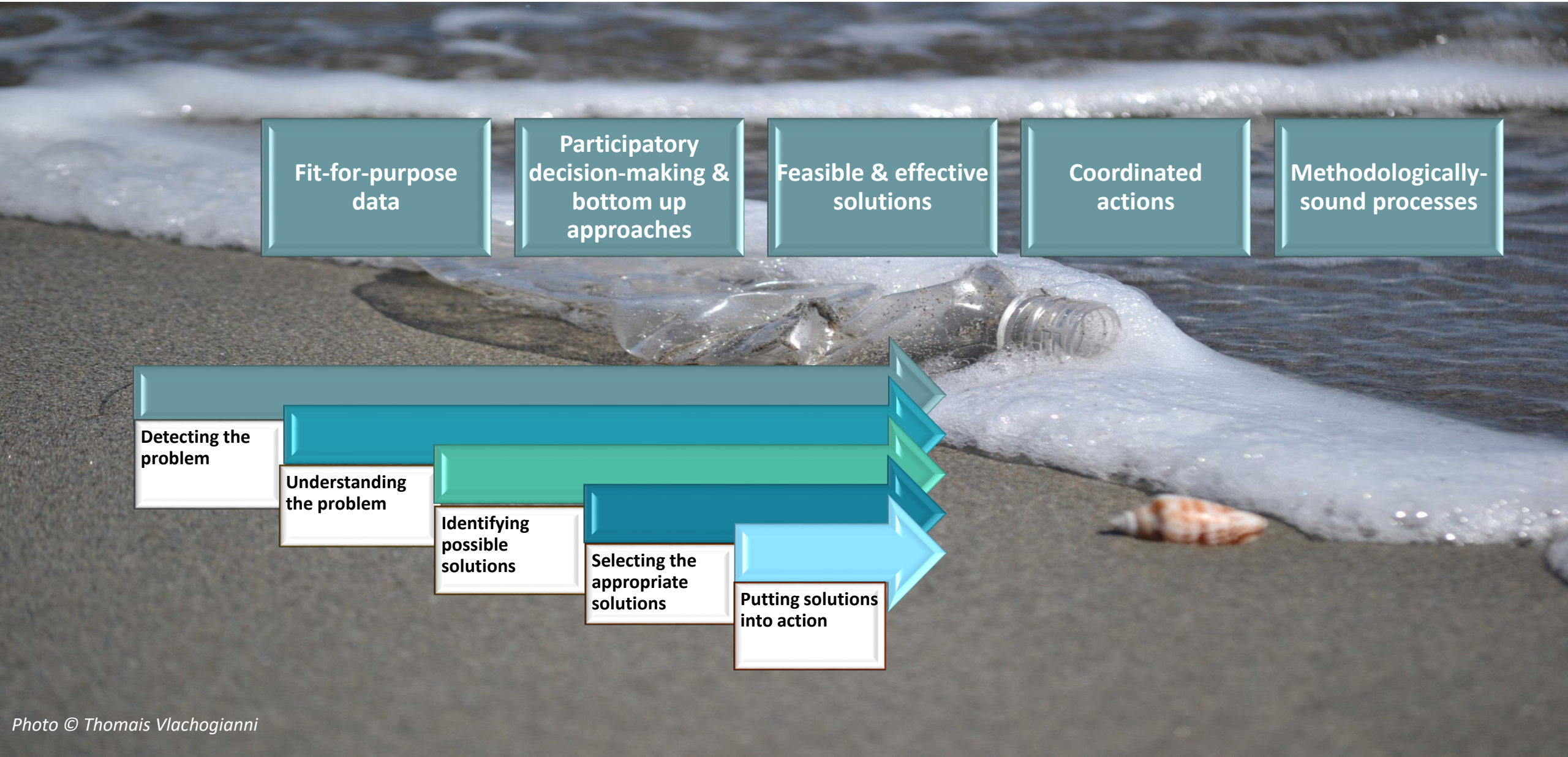
MARINE LITTER MONITORING WITHIN THE SCOPE OF THE MANAGEMENT CYCLE OF MARINE LITTER



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MARINE LITTER MONITORING & KEY LEGISLATIVE FRAMEWORKS

Water and Environment Support
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KEY LEGISLATIVE FRAMEWORKS

EU	Barcelona Convention
Marine Strategy Framework Directive	Ecosystem Approach
Plastics Strategy	Regional Plan for Marine Litter Management in the Mediterranean
Single-Use Plastics Directive	

WHAT IS MONITORING

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Monitoring is a **long term, standardized** measurement, observation, evaluation and reporting of the environment in order **to define status** and **trends**.

Marine litter monitoring aims to provide information on the **types, quantities, distribution** and **impacts** of marine litter; to **identify the sources** of marine litter; and to **assess the effectiveness of management measures** to address the issue.

KEY TERMS & DEFINITIONS…

Survey

The process of **recording data** related to a **sampling unit** at a given time.

Survey site

A **section of coast, sea surface or seafloor** chosen for placing one or more sampling units.

Monitoring campaign

The long-term process of carrying out one or more surveys in one or more survey sites with a certain frequency and within a given time period.

Monitoring method

A detailed description of the **procedural method** for monitoring marine litter pollution, including a classification list of litter types.

Macrolitter

Litter items **larger than 25 mm** in the longest dimension, with no set upper limit.

Mesolitter

Litter items **from 5 mm to 25 mm** in the longest dimension.

Microlitter

Litter items **smaller than 5 mm** in the longest dimension, with no set lower limit

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MONITORING & ASSESSMENT OF MARINE LITTER

- Beach
- Sea surface
- Seafloor
- Biota

MACROLITTER ITEMS > 2.5 CM

MICROLITTER ITEMS < 0.5 CM

Fit-for-purpose data → Comparable data → Reliable data

MAIN MONITORING METHODS FOR MARINE MACROLITTER

Methodology for monitoring MACROLITTER on the beach

Monitoring MACROLITTER on the seafloor with visual census

Methodology for monitoring MACROLITTER on the sea surface

Methodology for monitoring MACROLITTER on the seafloor with bottom trawl surveys

MAIN MONITORING METHODS FOR MARINE MICROLITTER

Beach sediments

Sea surface

Seafloor sediments

Biota

THE MONITORING METHODS ADDRESSED BY WES

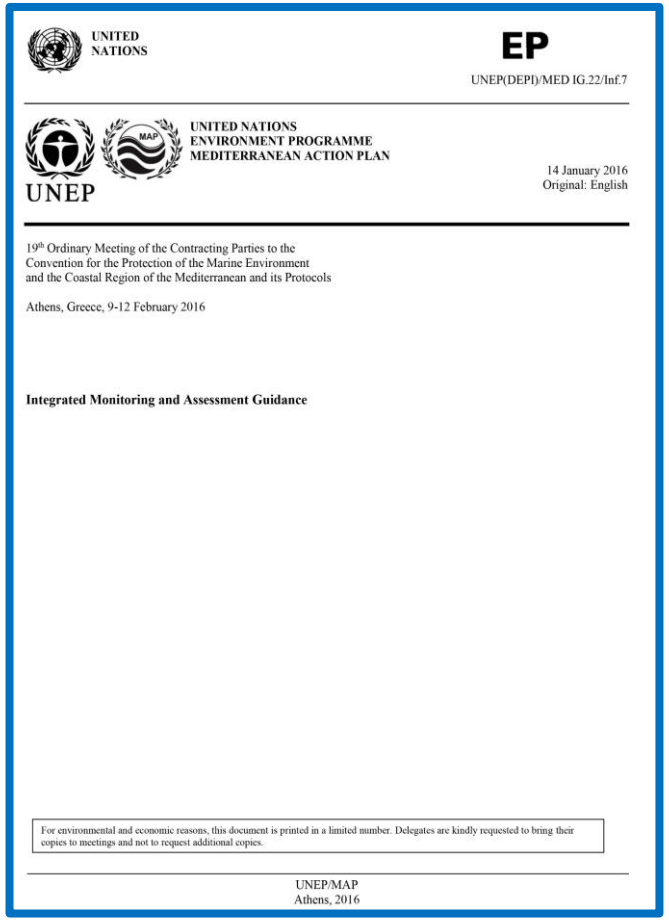
Monitoring marine litter on the sea surface with visual census

Monitoring marine litter on the sea floor with visual census by scuba divers

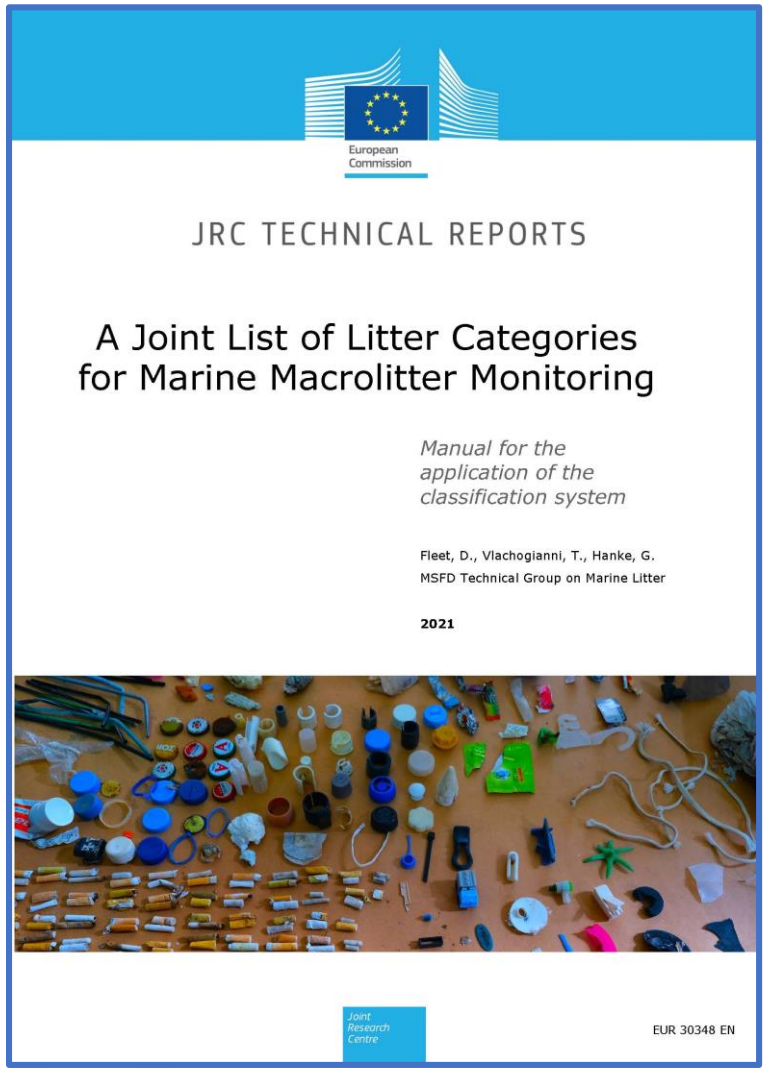
MARINE MACROLITTER MONITORING | KEY ELEMENTS

- **Monitoring Strategy**
  - Site selection
  - Frequency & timing
  - Sampling unit
- **Survey Protocols**
  - Litter ‘sampling’
  - Litter size classes & classification
  - Litter removal & disposal

KEY MARINE LITTER MONITORING GUIDELINES



THE JOINT LIST OF LITTER CATEGORIES



THE JOINT LIST:
A LIST FOR ALL MARINE COMPARTMENTS

Beach

Sea surface

Seafloor

Biota

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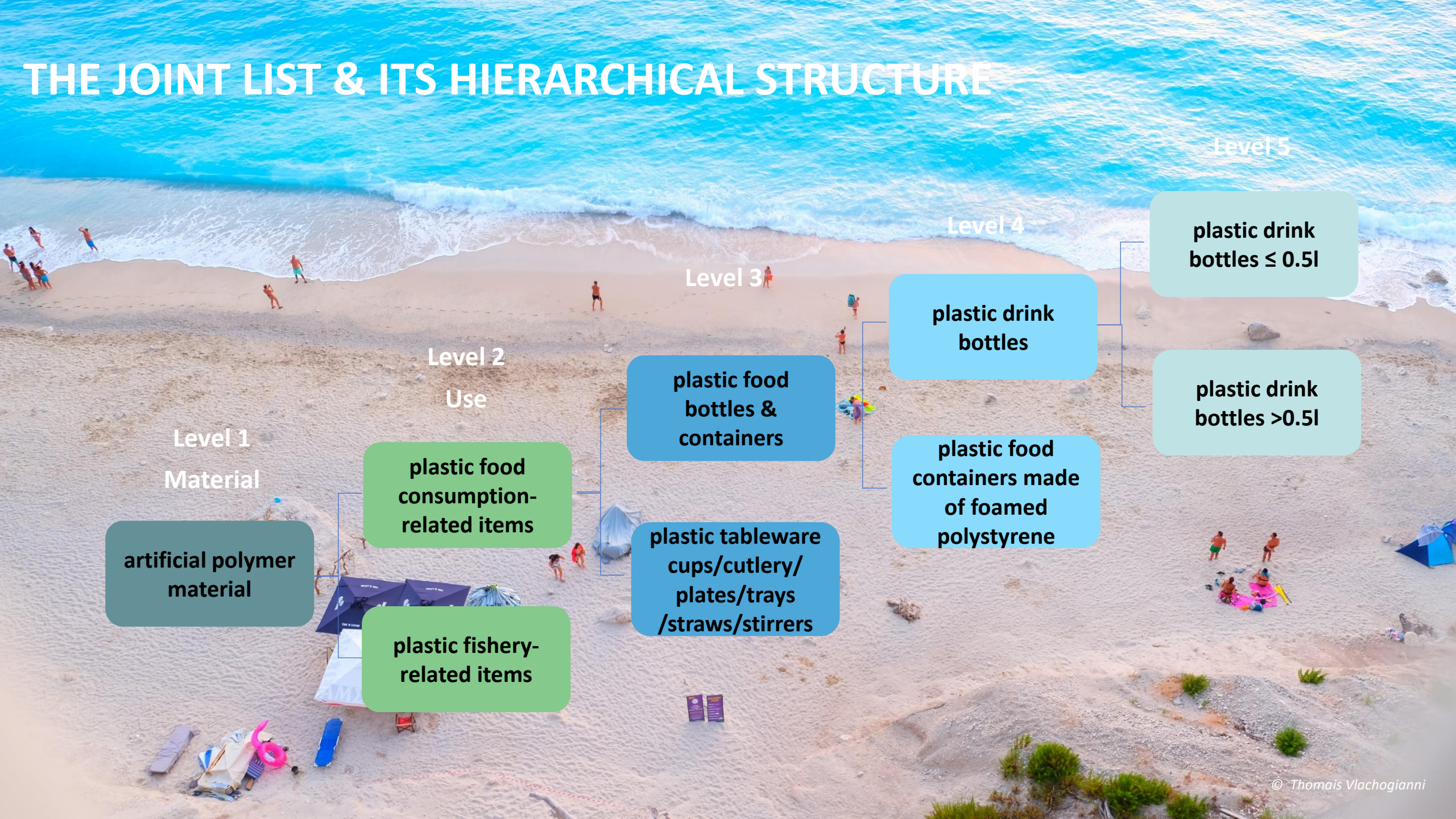
THE JOINT LIST & ITS HIERARCHICAL STRUCTURE



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THE USE CATEGORIES

Type-code	Name
ag_	agriculture related
aq_	aquaculture related
cl_	clothing
co_	building & construction related
fc_	food consumption related
fi_	fisheries related
hy_	personal hygiene and care related
md_	medical related
nn_	undefined use
re_	recreation related
sm_	smoking related
vk_	vehicle related
hu_	hunting related

Harmonized data

Comparable data

Reliable data

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HOW DOES THE LIST LOOK LIKE?

Litter type-codes	Litter type
pl_	artificial polymer materials
pl_fc_	plastic food consumption related items
pl_fc_b&c_	plastic food consumption related bottles and containers
pl_fc_b&c_dbot_	plastic drink bottles
pl_fc_b&c_dbot_lage	plastic drink bottles > 0.5 l
pl_fc_b&c_dbot_smll	plastic drink bottles ≤ 0.5 l

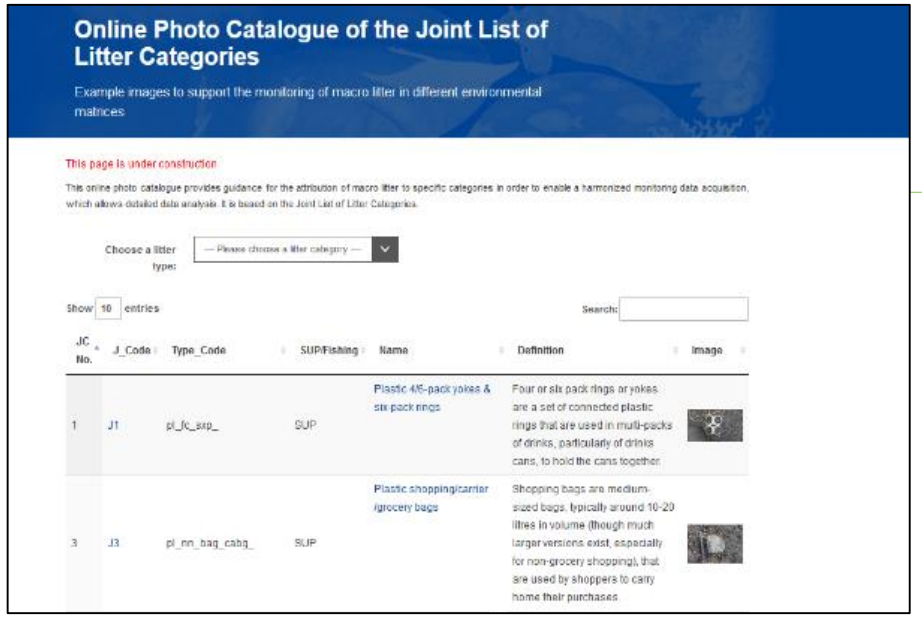
Photo © Thomais Vlachogianni

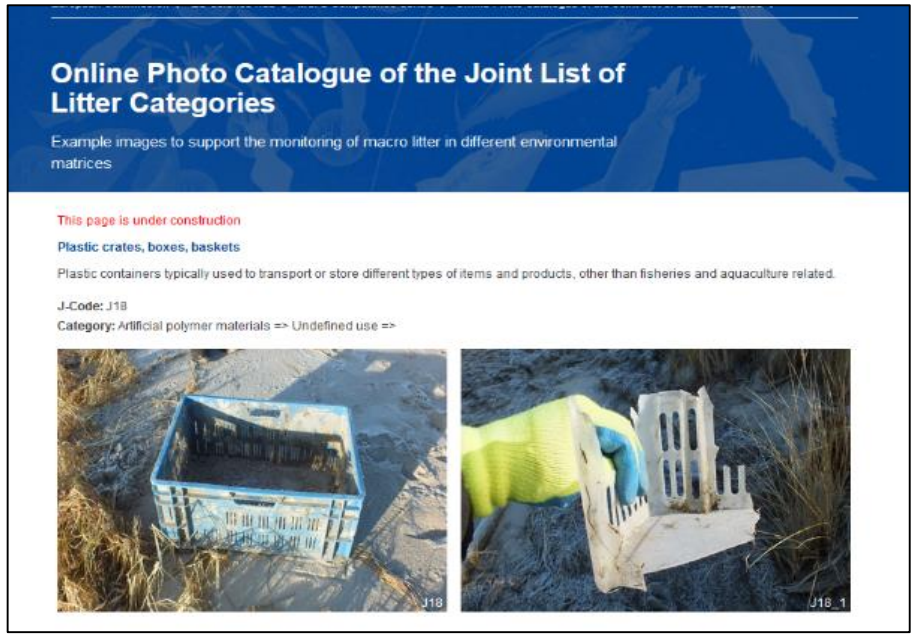
THE J-CODE LIST

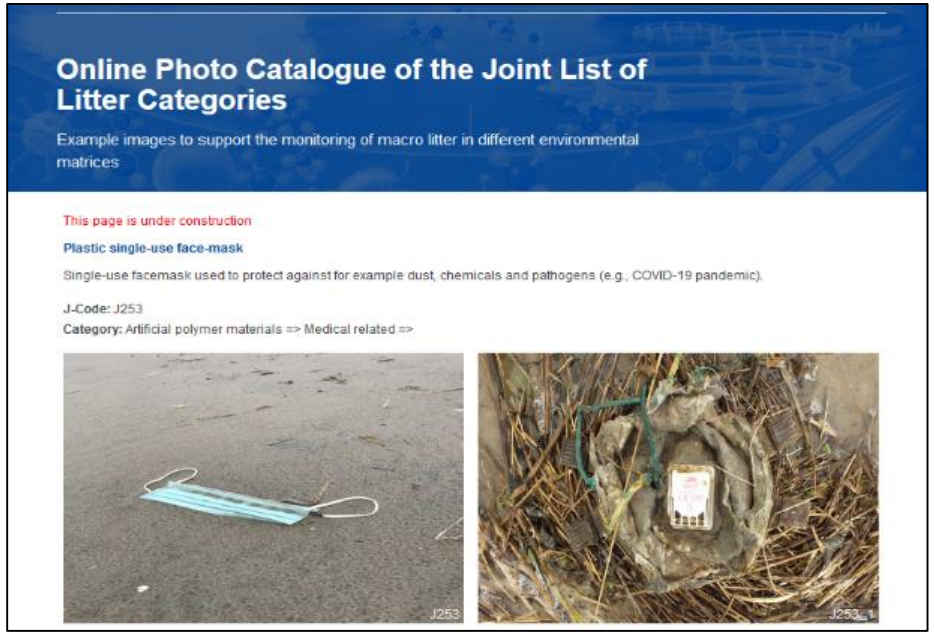
ARTIFICIAL POLYMER MATERIALS			
Code	Items name	Item counts	Total
J220	plastic sheeting from greenhouses		
J221	plastic irrigation pipes		
J222	other plastic items from agriculture		
J90	plastic flower pots		
J223	trays for seedlings of foamed plastic		
J46	plastic oyster trays		
J45	plastic mussels/oyster mesh bags, net sack, socks		
J47	plastic sheeting from mussel culture (Tahitians)		
J102	plastic flip-flops		
J136	footwear made of plastic - not flip flops		
J40	plastic gloves (household/dishwashing, gardening)		
J41	plastic gloves (industrial/professional applications)		
J252	single-use plastic gloves		
J69	plastic hard hats/helmets		
J256	foamed plastic insulation including spray foam		
J89	plastic construction waste (not foamed insulation)		
J8	plastic drink bottles >0.5 l		
J7	plastic drink bottles ≤ 0.5 l		
J224	plastic food containers made of foamed polystyrene		
J21	plastic caps/lids drinks		
J225	plastic food containers made of hard non-foamed plastic		
J1	plastic 4/6-pack yokes & six-pack rings		
J226	cups and cup lids of foamed polystyrene		
J227	cups and lids of hard plastic		
J228	plastic cutlery		
J229	plastic plates and trays		
J230	plastic stirrers		
J231	plastic straws		
J30	plastic crisps packets/sweets wrappers		
J31	plastic lolly & ice-cream sticks		
J85	plastic commercial salt packaging		
J58	fish boxes - foamed polystyrene		

METAL			
Code	Items name	Item counts	Total
J194	metal cables		
J175	metal drinks cans		
J176	metal food cans		
J181	metal tableware (e.g. plates, cups & cutlery)		
J184	metal lobster/crab pots		
J182	metal fisheries related weights/sinkers, and lures		
J180	metal appliances (refrigerators, washers, etc.)		
J187	metal drums & barrels		
J174	metal aerosol/spray cans		
J188	other metal cans		
J190	metal paint tins		
J178	metal bottle caps, lids & pull tabs from cans		
J195	metal household batteries		
J177	metal foil wrappers, aluminium foil		
J199	other metal pieces > 50cm		
J198	other metal pieces 2.5cm ≥ ≤ 50cm		
J186	metal industrial scrap		
J191	wire, wire mesh, barbed wire		
J179	metal disposable BBQs		
J193	metal vehicle parts / batteries		

183 litter types







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THE IMAP LIST

ID	PLASTIC/POLYSTYRENE
G1	4/6-pack yokes, six-pack rings
G3	Shopping bags incl. pieces
G4	Small plastic bags, e.g. freezer bags incl. pieces
G5	Plastic bag collective role; what remains from rip-off plastic bags
G7/G8	Drink bottles
G9	Cleaner bottles & containers
G10	Food containers incl. fast food containers
G11	Beach use related cosmetic bottles and containers, e.g. Sunblocks
G14	Engine oil bottles & containers <50 cm
G15	Engine oil bottles & containers >50 cm
G16	Jerry cans (square plastic containers with handle)
G17	Injection gun containers (including nozzles)
G13	Other bottles & containers
G18	Crates and containers / baskets
G19	Car parts
G21/24	Plastic caps and lids (including rings from bottle caps/lids)
G26	Cigarette lighters
G28	Pens and pen lids
G29	Combs/hair brushes/sunglasses
G30/31	Crisps packets/sweets wrappers/ Lolly sticks
G32	Toys and party poppers
G33	Cups and cup lids
G34/35	Cutlery and trays/Straws and stirrers
G36	Fertiliser/animal feed bags
G37	Mesh vegetable bags
G40	Gloves (washing up)
G41	Gloves (industrial/professional rubber gloves)
G42	Crab/lobster pots and tops
G43	Tags (fishing and industry)
G44	Octopus pots
G45	Mussels nets, Oyster nets including plastic stoppers
G46	Oyster trays (round from oyster cultures)
G47	Plastic sheeting from mussel culture (Tahitians)
G49	Rope (diameter more than 1cm)
G50	String and cord (diameter less than 1 cm)

130 litter types

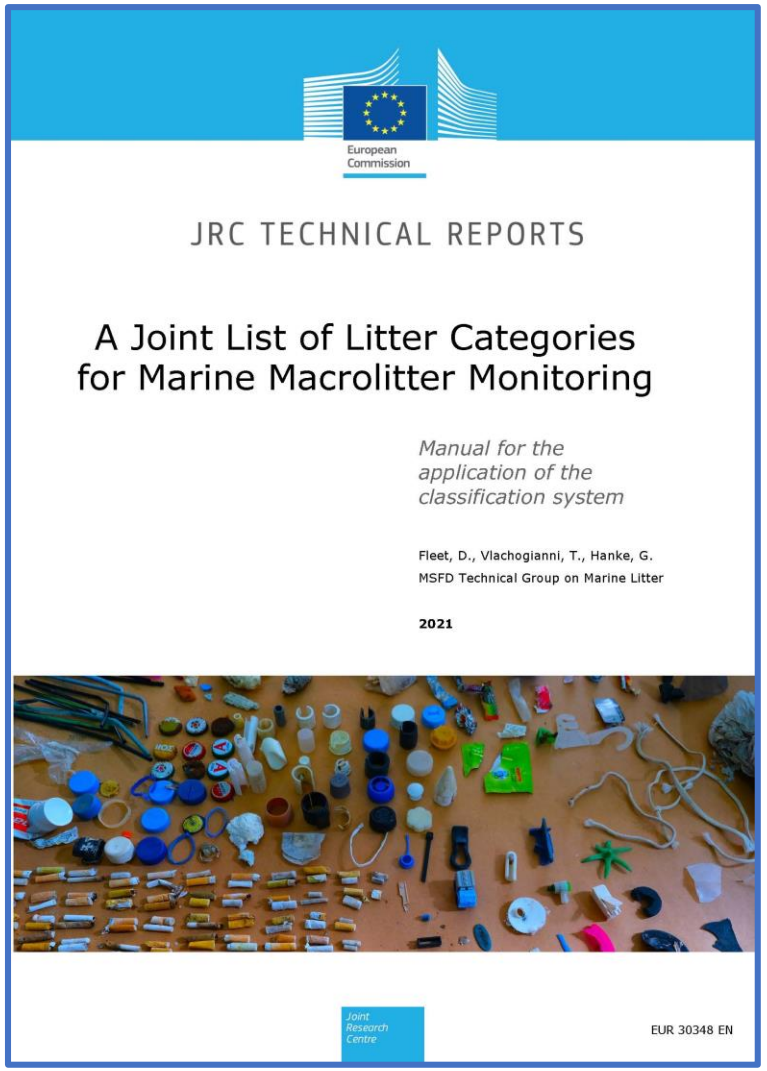
- ❑ Plastic/Polystyrene
- ❑ Rubber
- ❑ Cloth
- ❑ Paper/Cardboard
- ❑ Processed/Worked Wood
- ❑ Metal
- ❑ Glass
- ❑ Ceramics
- ❑ Sanitary Waste
- ❑ Medical Waste
- ❑ Paraffin/Wax
- ❑ Faeces

THE JOINT LIST VS THE IMAP LIST

Policy context	Litter size	Materials / main categories	List & item categories
EU MSFD	> 2.5 cm + 15 categories even if < 2.5 cm	AP, R, C/T, P, WW, M, G/CE, CH, OF	Joint list (Fleet 2021) 183 categories
Barcelona Convention	> 5 mm	AP, R, C, P, WW, M, G, C, SW, MW, F, PW	IMAP list 131 categories:

THE CLASSIFICATION LIST FOR ALL SURVEYS

- Survey Protocols
  - Litter ‘sampling’
  - Litter size classes & classification
  - Litter removal & disposal



THE JOINT LIST
183 litter types

THE IMAP LIST
131 categories

THE PLASTIC BUSTERS RESOURCES

Union for the Mediterranean
Union pour la Méditerranée
الاتحاد من أجل المتوسط

Interreg Mediterranean
EUROPEAN UNION
PLASTIC BUSTERS MPAs

ENI CBCMED
Cooperating across borders in the Mediterranean

Project funded by the EUROPEAN UNION

REGIONE AUTÒNOMA DE SARDIGNA
REGIONE AUTONOMA DELLA SARDEGNA

Plastic Busters CAP

PLASTIC BUSTERS TOOLKIT & ELEARNING MODULE

Self-paced distance learning course
Plastic Busters MPAs module on how to monitor the presence and effects of MARINE LITTER
https://envirolearning.net/catalog/info/id:153

SITE SELECTION CRITERIA

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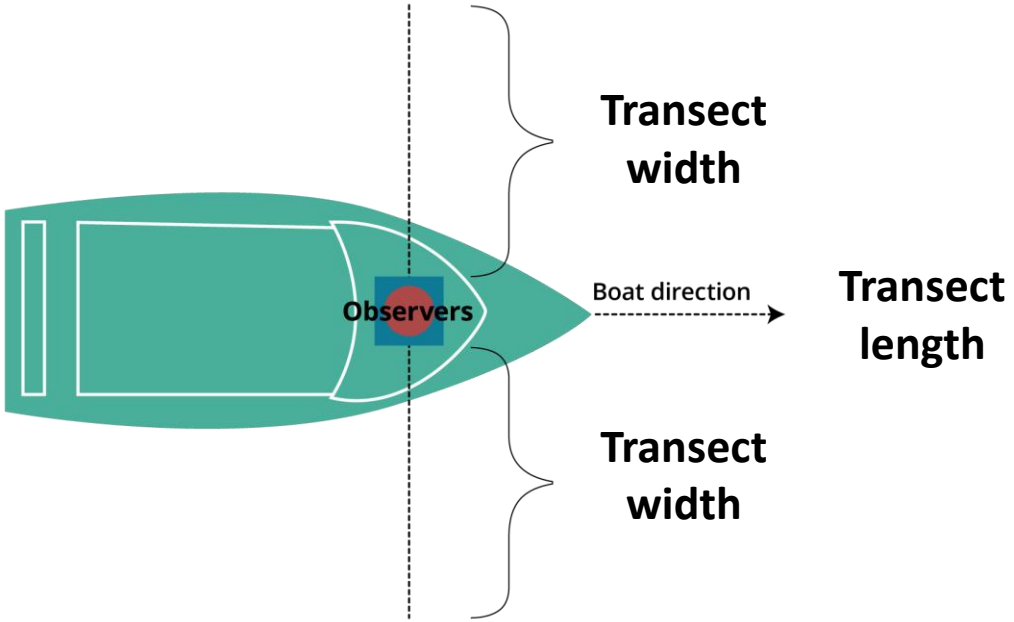
- Low density areas (e.g. open sea)
- High density areas (e.g. close to ports)
- Other selected areas e.g. in estuaries, in the vicinity of cities, in local areas of touristic, recreational or commercial traffic

MONITORING MARINE LITTER ON THE SEA SURFACE WITH VISUAL CENSUS

Water and Environment Support
in the ENI Southern Neighbourhood region

Spring: April

Autumn: October



MONITORING MARINE LITTER ON THE SEA SURFACE WITH VISUAL CENSUS

Water and Environment Support
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- ✓ **The transect width** recommended to be used **for small-scale vessels is 3 m on each side of the boat (6 m in total if two observers are deployed)** and for **medium-scale vessels 5 m on each side of the boat (10 m in total if two observers are deployed).**
- ✓ The transect length should correspond approximately to 1 h of observation for each survey with a boat speed of 4-6 knots.

MONITORING MARINE LITTER ON THE SEA SURFACE WITH VISUAL CENSUS

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MONITORING MARINE LITTER ON THE SEA SEAFLOOR WITH VISUAL CENSUS

Water and Environment Support
in the ENI Southern Neighbourhood region

Spring: April

Autumn: October

MONITORING MARINE LITTER ON THE SEA SEAFLOOR WITH VISUAL CENSUS

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MONITORING MARINE LITTER ON THE SEA SEAFLOOR WITH VISUAL CENSUS

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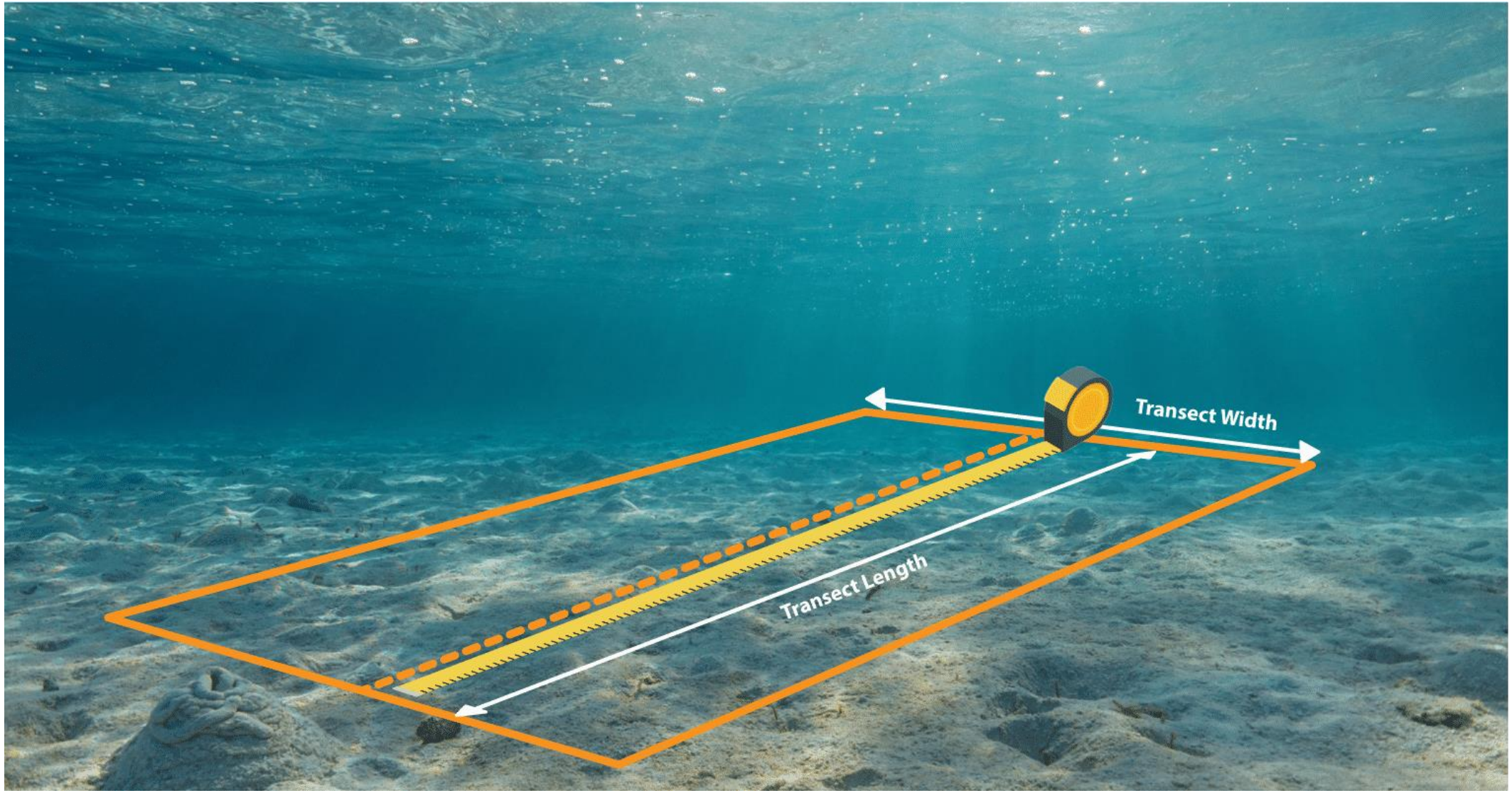
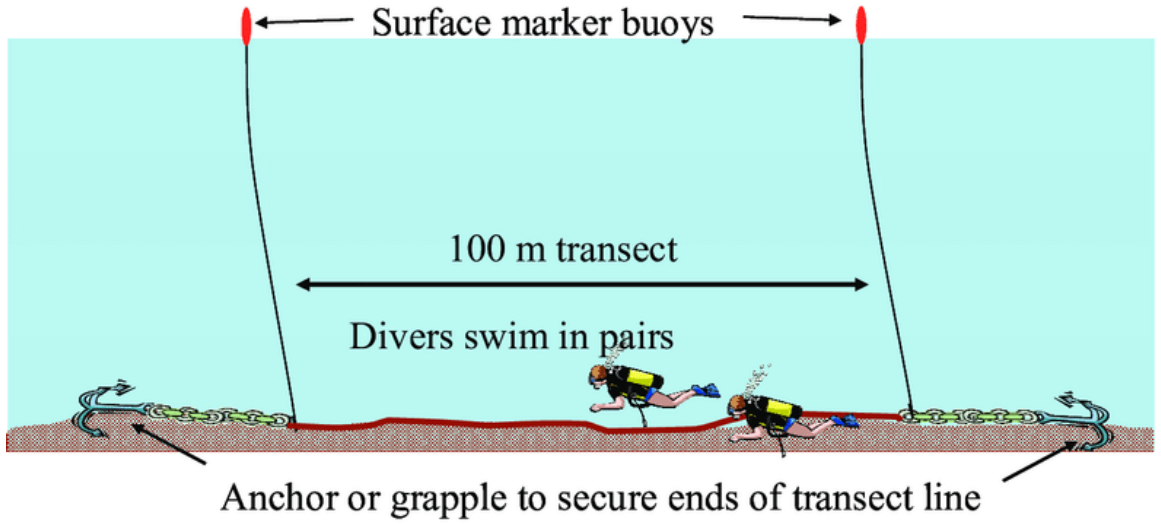


MONITORING MARINE LITTER ON THE SEA FLOOR WITH VISUAL CENSUS | SAMPLING



Litter Density	Environmental Conditions	Sampling Unit (length x width)
0.1 – 1 items / m^2	Low turbidity	20 m x 4 m
0.1 – 1 items / m^2	High turbidity	20 m x 4 m
0.01 – 0.1 items / m^2	In every case	100 m x 8 m
< 0.01 items / m^2	In every case	200 m x 8 m

- ✓ The survey area is defined by the transect width and length.
- ✓ The start and end point of each transect should be identified with marker buoys and recorded using a GPS.
- ✓ The length of the line transects could vary between 50m-100m and the width from 4m-8m, depending on the depth, the depth gradient, the turbidity, the habitat complexity and the litter density.
- ✓ Digital photos should be taken for all items with an underwater camera; lighter litter items should be collected and brought ashore, while larger items should just be marked.
- ✓ The unit in which litter should be recorded is number of items and it should be expressed as counts of litter items per square kilometer (litter items/km^2).

TOPICS OF DISCUSSION…

- Who will be involved in the monitoring campaigns
- Identification of the survey sites and definition of the number of surveys
- Securing the required equipment
- Planning the survey campaigns (securing permits if needed; defining the dates; etc.)

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Thank you for your attention!

www. wes-med.eu

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